

REMARKS

Applicant has reviewed and considered the Office Action mailed on May 04, 2007 and the references cited therein.

Claims 1, 4, 6-7, 10, 15, 18, 20, 30, 32-34, and 37-38 have been amended and claims 5, 8-9, 17, and 19 have been canceled herein. As a result, claims 1-4, 6-7, 10-16, 18, 20-21, and 30-38 are now pending in this application.

Claim Objections

Claims 4, 5, 8, 9, 18 and 19 were objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to recite a meaningful limitation that further limits respective parent claims 1 and 15.

Claims 5, 8, 9, and 19 have been cancelled herein. Claims 4 and 18 have been amended in a manner that is believed to address this objection.

35 USC § 112 Rejection of the Claims

Claims 4, 5, 8-10, 18-20, 33, 37 and 38 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

As described above, claims 5, 8, 9, and 19 have been cancelled herein. In addition, claims 4, 18, 33, and 37 have been amended to remove the terms “the matrix,” “the list file,” and “Appendix A.” Furthermore, claims 10, 20, and 38 have been amended to remove the term “bit-length.”

Please note that the term “Appendix A” has been added to independent claims 1, 15, 30, and 34 in the present response. It is submitted that this does not create an antecedent basis problem as neither of the definite articles “the” and “said” are used in front of the term in the independent claims. The term “Appendix A” is referring to the sole appendix in the patent application as filed. Because of the length of the appendix (i.e., 14 pages), it is believed that the physical inclusion of the subject matter therein in the claims would make the claims unreasonably long. The recitation of an appendix in the claims of a patent is a technique that has been allowed by the U.S. Patent and Trademark Office in the past (see, e.g., U.S. Patent No.

6,563,436 to Fimoff et al. and U.S. Patent No. 6,795,505 to Felts) and it is believed that such recitation is warranted in the present application.

35 USC § 103 Rejection of the Claims

Claims 1, 2, 4-10, 15-20, and 34-38 were rejected under 35 USC § 103(a) as being unpatentable over *Yang et al.* (Michael Yang, Yan Li and William E. Ryan; Design of Efficiently Encodable Moderate-Length High-Rate Irregular LDPC Codes: Proceedings of the Annual Conference on Communication, Control and Computing, October 2, 2002, pages 1415-1424) in view of *Lu et al.* (Ben Lu, Xiaodong Wang, and Krishna R. Narayanan; LDPC-Based Space-Time Coded OFDM Systems Over Correlated Fading Channels: Performance Analysis and Receiver Design; IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 50, NO.1, JANUARY 2002, pages 74-88).

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Claim 1 is an independent claim directed to a wireless apparatus. More specifically, the wireless apparatus comprises: (a) a forward error correction (FEC) coder to encode digital data using a low density parity check (LDPC) code, said FEC coder including: (i) a computer readable storage medium storing at least a first portion of a parity check matrix, wherein said parity check matrix is substantially as described in Appendix A and said first portion includes at least half of said parity check matrix; (ii) a matrix multiplication unit to multiply input data by a transpose of said first portion of said parity check matrix to generate modified data; (iii) a differential encoder to differentially encode said modified data to generate coded data; and (iv) a concatenation unit to concatenate the input data and the coded data to form a code word; and (b) a wireless transmitter to transmit a wireless signal that includes said code word.

Neither Yang et al. nor Lu et al. discloses or suggests, either alone or in combination, “a computer readable storage medium storing at least a first portion of a parity check matrix, wherein said parity check matrix is substantially as described in Appendix A and said first portion includes at least half of said parity check matrix.” The portion of the parity check matrix described in Appendix A that is stored on the computer readable storage medium is functional

descriptive material (see MPEP 2106.01). As described at page 9, line 25 to page 10, line 1 of the specification-as-filed of the present application, the LDPC code associated with the parity check matrix of Appendix A was “designed to provide good performance with variable-length data blocks, while still achieving a manageable implementation complexity. The codeword length has been selected to provide a good tradeoff between performance and complexity for use in wireless (and some wireline) applications.” Neither of the references cited by the Examiner disclose or suggest a storage medium having the claimed parity check matrix or the use thereof. Support for the amendment to claim 1 (and the other independent claims) can be found at least at page 9, lines 14-25 of the specification-as-filed. The portion of the parity check matrix of Appendix A having columns of weight 4 is clearly more than half of the parity check matrix and thus supports the added claim language.

Based on the foregoing, it is submitted that claim 1, as amended, is allowable over the combination of Yang et al. and Lu et al. Reconsideration and allowance of claim 1 is therefore respectfully requested. Similar arguments apply to amended independent claims 15 and 34.

Claims 2, 4, 6-7, and 10, claims 16, 18 and 20, and claims 35-38 are dependent claims that depend either directly or indirectly from independent claims 1, 15, and 34, respectively. Consequently, these claims are allowable for at least the same reasons as their corresponding base claims. These claims also provide further bases for patentability. For example, claim 4 further defines the “first portion of said parity check matrix” of claim 1 as being “a portion that includes columns of said parity check matrix having a column weight of 4.” Claim 7 further defines the “storage medium” of claim 1 as storing the first portion of the parity check matrix as a matrix transpose.” Neither Yang et al. nor Lu et al., either alone or in combination, disclose or suggest these limitations.

Claims 5, 8-9, 17, and 19 have been canceled.

Claims 3 and 21 were rejected under 35 USC § 103(a) as being unpatentable over *Yang* (Michael Yang, Yan Li and William E. Ryan; Design of Efficiently Encodable Moderate-Length High-Rate Irregular LDPC Codes: Proceedings of the Annual Conference on Communication, Control and Computing, October 2, 2002, pages 1415-1424) and *Lu et al.* (Ben Lu, Xiaodong Wang, and Krishna R. Narayanan; LDPC-Based Space-Time Coded OFDM Systems Over Correlated Fading Channels: Performance Analysis and Receiver Design; IEEE

TRANSACTIONS ON COMMUNICATIONS, VOL. 50, NO.1, JANUARY 2002, pages 74-88) in view of *Goldstein et al.* (US Patent 6862552 B2).

Claims 3 and 21 are dependent claims that depend directly from independent claims 1 and 15, respectively. Consequently, these claims are allowable for at least the same reasons as their corresponding base claims.

Claims 11-13 were rejected under 35 USC § 103(a) as being unpatentable over *Yang* (Michael Yang, Yan Li and William E. Ryan; Design of Efficiently Encodable Moderate- Length High-Rate Irregular LDPC Codes: Proceedings of the Annual Conference on Communication, Control and Computing, October 2, 2002, pages 1415-1424) and *Lu et al.* (Ben Lu, Xiaodong Wang, and Krishna R. Narayanan; LDPC-Based Space-Time Coded OFDM Systems Over Correlated Fading Channels: Performance Analysis and Receiver Design; IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 50, NO.1, JANUARY 2002, pages 74-88) in view of *Dougherty; Angus O. et al.* (US Patent 6831902 B1).

Claims 11-13 are dependent claims that each depend directly from independent claim 1. Consequently, these claims are allowable for at least the same reasons as claim 1.

Claim 14 was rejected under 35 USC § 103(a) as being unpatentable over *Yang* (Michael Yang, Yan Li and William E. Ryan; Design of Efficiently Encodable Moderate- Length High-Rate Irregular LDPC Codes: Proceedings of the Annual Conference on Communication, Control and Computing, October 2, 2002, pages 1415-1424) and *Lu et al.* (Ben Lu, Xiaodong Wang, and Krishna R. Narayanan; LDPC-Based Space-Time Coded OFDM Systems Over Correlated Fading Channels: Performance Analysis and Receiver Design; IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 50, NO.1, JANUARY 2002, pages 74-88) in view of *Bordogna; Mark Aldo et al.* (US Patent 6683855 B1).

Claim 14 is a dependent claim that each depends directly from independent claim 1. Consequently, this claim is allowable for at least the same reasons as claim 1.

Claims 30-33 were rejected under 35 USC § 103(a) as being unpatentable over *Yang* (Michael Yang, Yan Li and William E. Ryan; Design of Efficiently Encodable Moderate-Length High-Rate Irregular LDPC Codes: Proceedings of the Annual Conference on Communication, Control and Computing, October 2, 2002, pages 1415-1424) and *Lu et al.* (Ben Lu, Xiaodong Wang, and Krishna R. Narayanan; LDPC-Based Space-Time Coded OFDM Systems Over

Correlated Fading Channels: Performance Analysis and Receiver Design; IEEE TRANSACTIONS ON COMMUNICATIONS, VOL. 50, NO.1, JANUARY 2002, pages 74-88) in further view of *Brankovic* (US Patent 6198460 B1).

Independent claim 30, as amended, is allowable for at least the same reasons as claim 1 discussed above.

Claims 31-33 are dependent claims that each depend directly from claim 30. Consequently, these claims are allowable for at least the same reasons as independent claim 30. These claims also provide further bases for patentability. For example, claim 32, as amended, further defines the “first portion of said parity check matrix” of claim 30 as being “a portion that includes columns of said parity check matrix having a column weight of 4.” Claim 33 further defines the “storage medium” of claim 30 as storing “said first portion of said parity check matrix as a matrix transpose.” None of the references relied upon by the Examiner, either alone or in combination, disclose or suggest these limitations.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (480-948-3745) to facilitate prosecution of this application.

Respectfully submitted,

BO XIA ET AL.

By their Representatives,

Customer Number: 45643
480-948-3745

Date September 4, 2007

By



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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 4th day of September, 2007.

Christine Hartness

Signature

